

What is claimed is:

1. Glass for a light filter having a coefficient of thermal expansion within a range from $90 \times 10^{-7}/^{\circ}\text{C}$ to $120 \times 10^{-7}/^{\circ}\text{C}$ within a temperature range from -20°C to $+70^{\circ}\text{C}$ and having a composition which comprises, in weight percent:

one or more ingredients selected from the group consisting of SiO_2 , B_2O_3 and P_2O_5 in the total amount of 35 - 55%, wherein the upper limit of SiO_2 is 41.5%;

one or more ingredients selected from the group consisting of TiO_2 , La_2O_3 , ZrO_2 , Nb_2O_5 , Ta_2O_5 , WO_3 and Y_2O_3 in the total amount of 20 - 45%, wherein TiO_2 up to 30% is included and ZrO_2 is included within a range from 0 to 5%;

one or more ingredients selected from the group consisting of MgO , CaO , SrO , BaO and ZnO in the total amount of 3 - 20%;

Na_2O within a range from 0 to 14.5%; and

one or both of Sb_2O_3 and As_2O_3 in the total amount of 0 - 1%,

said glass being substantially free of Al_2O_3 , CdO and PbO .

2. Glass as defined in claim 1 which has Young's modulus of 75GPa or over.

3. Glass as defined in claim 1 which has Vickers hardness of 550 or over.

4. Glass as defined in claim 1 wherein light transmittance for plate thickness of 10mm is 90% or over within a wavelength range from 950nm to 1600nm.

5. A light filter which is made by forming a dielectric film on glass as defined in claim 1.

6. A light filter which is made by forming a dielectric film on glass having a larger coefficient of thermal expansion than dielectric which constitutes the dielectric film.

7. Glass for a light filter having a coefficient of thermal expansion within a range from $90 \times 10^{-7}/^{\circ}\text{C}$ to $120 \times 10^{-7}/^{\circ}\text{C}$ within a temperature range from -20°C to $+70^{\circ}\text{C}$ and having a composition which comprises, in weight percent:

one or more ingredients selected from the group consisting of SiO_2 , B_2O_3 and P_2O_5 in the total amount of 35 - 55%, wherein the upper limit of SiO_2 is 41.5%;

TiO₂ up to 30%;

ZrO₂ within a range from 0 to 5%;

one or more ingredients selected from the group consisting of MgO, CaO, SrO, BaO and ZnO in the total amount of 3 - 20%;

one or more ingredients selected from the group consisting of Li₂O, Na₂O and K₂O in the total amount of 5 - 30%, wherein Na₂O is included within a range from 0 to 14.5%; and

one or both of Sb_2O_3 and As_2O_3 in the total amount of 0 - 1%, said glass being substantially free of Al_2O_3 , CdO and PbO .

~~8. Glass as defined in claim 7 which has Young's modulus of 75GPa or over.~~

9. Glass as defined in claim 7 which has Vickers hardness of 550 or over.

~~10. Glass as defined in claim 7 wherein light transmittance for plate thickness of 10mm is 90% or over within a wavelength range from 950nm to 1600nm.~~

11 A light filter which is made by forming a dielectric film on glass as defined

B
in claim 7..

12. Glass for a light filter having a coefficient of thermal expansion within a range from $90 \times 10^{-7}/^{\circ}\text{C}$ to $120 \times 10^{-7}/^{\circ}\text{C}$ within a temperature range from -20°C to $+70^{\circ}\text{C}$ and having a composition which comprises, in weight percent:

one or more ingredients selected from the group consisting of SiO_2 , B_2O_3 and P_2O_5 in the total amount of 35 - 55%, wherein the upper limit of SiO_2 is 41.5%;

one or more ingredients selected from the group consisting of TiO_2 , La_2O_3 , ZrO_2 , Nb_2O_5 , Ta_2O_5 , WO_3 and Y_2O_3 in the total amount of 20 - 45%, wherein TiO_2 up to 30% is included and ZrO_2 is included within a range from 0 to 5%;

one or more ingredients selected from the group consisting of MgO , CaO , SrO , BaO and ZnO in the total amount of 3 - 20%;

Na_2O within a range from 0 to 14.5%; and

one or both of Sb_2O_3 and As_2O_3 in the total amount of 0 - 1%,

said glass being substantially free of Al_2O_3 , CdO and PbO .

13. Glass as defined in claim 12 which has Young's modulus of 75GPa or over.

14. Glass as defined in claim 12 which has Vickers hardness of 550 or over.

15. Glass as defined in claim 12 wherein light transmittance for plate thickness of 10mm is 90% or over within a wavelength range from 950nm to 1600nm.

16. A light filter which is made by forming a dielectric film on glass as defined in claim 12.

17. Glass for a light filter having a coefficient of thermal expansion within a range from $90 \times 10^{-7}^{\circ}\text{C}$ to $120 \times 10^{-7}^{\circ}\text{C}$ within a temperature range from -20°C to $+70^{\circ}\text{C}$ and having a composition which comprises, in weight percent:

one or more ingredients selected from the group consisting of SiO_2 , B_2O_3 and P_2O_5 in the total amount of 35 - 55%, wherein the upper limit of SiO_2 is 41.5%;

one or more ingredients selected from the group consisting of TiO_2 , La_2O_3 , ZrO_2 , Nb_2O_5 , Ta_2O_5 , WO_3 and Y_2O_3 in the total amount of 20 - 45%, wherein TiO_2 up to 30% is included;

one or more ingredients selected from the group consisting of MgO , CaO , SrO , BaO and ZnO in the total amount of 3 - 20%;

one or more ingredients selected from the group consisting of Li_2O , Na_2O and K_2O in the total amount of 5 - 30% (circled B) wherein Na_2O is included within a range from 0 to 14.5%; and

one or both of Sb_2O_3 and As_2O_3 in the total amount of 0 - 1%,

said glass being substantially free of CaO and CdO .

18. Glass as defined in claim 17 which has Young's modulus of 75GPa or over.

19. Glass as defined in claim 17 which has Vickers hardness of 550 or over.

20. Glass as defined in claim 17 wherein light transmittance for plate thickness of 10mm is 90% or over within a wavelength range from 950nm to 1600nm.

21. Glass as defined in claim 17 which is substantially free of PbO .

22 A light filter which is made by forming a dielectric film on glass as defined in claim 17..

23. Glass for a light filter having a coefficient of thermal expansion within a range from $90 \times 10^{-7}/^{\circ}\text{C}$ to $120 \times 10^{-7}/^{\circ}\text{C}$ within a temperature range from -20°C to $+70^{\circ}\text{C}$ and having a composition which comprises, in weight percent:

one or more ingredients selected from the group consisting of SiO_2 , B_2O_3 and P_2O_5 in the total amount of 35 - 55%, wherein the upper limit of SiO_2 is 41.5%;

one or more ingredients selected from the group consisting of TiO_2 , La_2O_3 , ZrO_2 , Nb_2O_5 , Ta_2O_5 , WO_3 and Y_2O_3 in the total amount of 20 - 45%, wherein TiO_2 up to 30% is included;

one or more ingredients selected from the group consisting of MgO , CaO , SrO , BaO and ZnO in the total amount of 3 - 20%;

one or more ingredients selected from the group consisting of Li_2O , Na_2O and K_2O in the total amount of 5 - 30%, wherein Na_2O is included within a range from 0 to 14.5%; and

one or both of Sb_2O_3 and As_2O_3 in the total amount of 0 - 1%,
said glass being substantially free of CaO and CdO .

TOP SECRET EYES ONLY

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